Center For Hydrogen Safety

Hydrogen Installation, Operation and Safety Issues

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(Proprietary Information)

DCH TECHNOLOGY™

Birth Of The CHS

Center For Hydrogen Safety

Fee-Based,Third Party Consulting Services Using senior staff with Collective Expertise

In these areas:

- ✓ **Hydrogen Process Reliability & Safety**
- ✓ **Project Development from Birth to Commercialization**
- ✓ **Product Design & Application**
- ✓ **Training**
- ✓ **Risk Mitigation**
- ✓ **Insurance Issues to include Coverage, Claims, & Forensic Engineering**

DCH TECHNOLOGY™

Mission Statement

Provide Our Customers With Superior Risk Management, Operational & Intrinsic Product Safety Services, Personnel Safety Training, and Financial Products Allowing For The Successful Implementation & Operation Of Products/Projects Involving Hydrogen On A Global Basis.

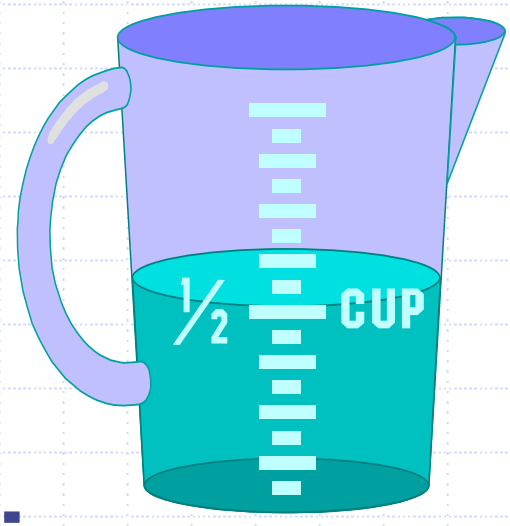
DCH TECHNOLOGY™

Hydrogen Applications Are Plentiful

- 100 Billion Cubic Feet / Year Used in Industry and Space Program
- These Industries Include Automotive, Transportation, Energy, Semiconductor, Medical, Aerospace, Metallurgical
- More Is Expected As The World Transitions to a Hydrogen-Based from a Petroleum-Based Economy

Perceptions Of Technology Risks

- Capacity Scale-up
- Reduced Maintenance
- Robustness of Equipment
- Integration Of Systems
- Operator Experience
- Codes & Standards Compliance
- Environmental Compliance



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Existing Codes & Standards

Consensus Building Occurring on Multiple Fronts Including:

- National Fire Protection Association (NFPA)
- National Hydrogen Association
- Compressed Gas Association (CGA)
- National Renewable Energies Lab's "Hydrogen Sourcebook"
- ISO/TC 197 Hydrogen Technologies Working Groups
- International Code Council
- European Integrated Hydrogen Project

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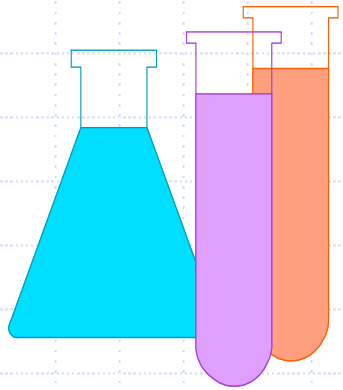
Referenced Codes & Standards

- ANSI
- ASME
- NHA Working Groups
- ISO Standards
- NFPA
- IEEE
- ICC
- 29 CFR 1910.103 Hydrogen

Codes & Standards Gap

- Incident Driven
- Consensus Building Is Inherently Time Consuming
- Special Interests Considerations
- Related Work For Different Fields Have Relevancy

Proposed Solutions



- Prudent Engineering Design
- Sound Judgment in Operations & Maintenance
- Supplement With Related Handbooks, Vendor Recommendations, Studies & Report
- Hydrogen Detection
- Early Involvement Of Local Authorities at planning stage

CHS Risk Assessment Work

- **Transit Company**
  - ✓ Harmonization and Integration of Safety Systems
- **Fuel Cells For Cars & Buses**
  - ✓ Adequate Ventilation
  - ✓ **Removal of Ignition Sources**
- **Industrial Applications Concerned With Safety**
  - ✓ **Detection For Process Control**
  - ✓ **Operator Awareness Training**

Conclusions

1. Rely Upon Best Engineering Judgment derived from Codes and Standards
2. Incorporate Knowledge From Other Sources and Experts (Recommended Good Practices & Guidelines)
3. Perform Due Diligence
4. Work as a "Team"